



# NONPOINT SOURCE SUCCESS STORY

## Oklahoma

### Implementing Agricultural Conservation Practices Improves Turbidity Levels in Middle Stillwater Creek

#### Waterbody Improved

Elevated turbidity levels resulted in the impairment of Stillwater Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list of impaired waters in 2004. Poor management of grazing lands, hay production and croplands contributed to this impairment. Implementation of conservation practice systems (CPs) to promote better quality grazing and crop land management decreased turbidity in the creek. As a result, Middle Stillwater Creek was removed from Oklahoma's 2010 CWA 303(d) list for turbidity impairment and now partially supports its warm water aquatic beneficial use.

#### Problem

Stillwater Creek flows through Noble and Payne counties before discharging to the Cimarron River in central Oklahoma (Figure 1). Land use in the 176,640-acre watershed is primarily grazing lands for cattle and hay production. About 20 percent of the watershed is forested and 5 percent is cropland. Approximately 10 percent of the watershed is developed land, including the city of Stillwater (population 47,000).

Poor management of grazing and crop lands, development, and stormwater runoff contributed to excess turbidity in Stillwater Creek. The stream was listed as impaired for turbidity in 2004 when 29 percent of baseflow turbidity samples violated standards. An Oklahoma stream is considered to violate the turbidity standard when more than 10 percent of baseflow samples are higher than 50 nephelometric turbidity units (NTU). On the basis of these assessment results, Oklahoma added the 16.43-mile middle segment of Stillwater Creek (OK620900040070\_10) to the 2004 CWA section 303(d) list for nonattainment of the warm water aquatic beneficial use.

#### Project Highlights

Landowners in the watershed worked with the Noble and Payne county conservation districts, the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), USDA Farm Services Agency (FSA), and the Oklahoma Conservation Commission (OCC) to implement CPs, which were installed through NRCS's Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives

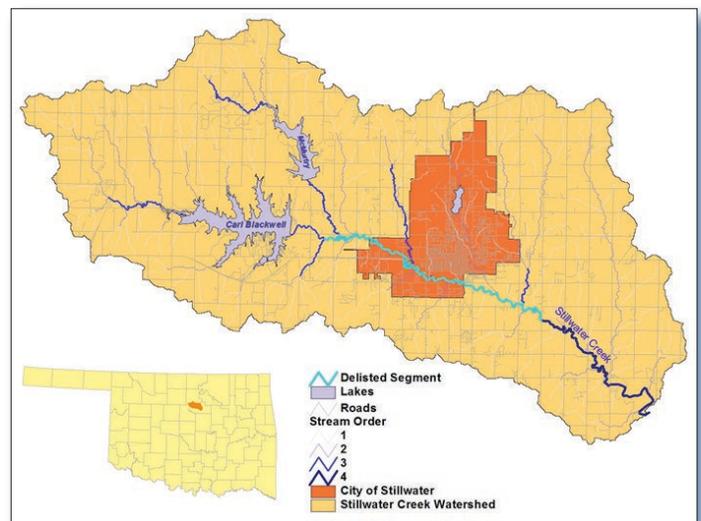


Figure 1. Stillwater Creek is in central Oklahoma.

Program, Conservation Stewardship Program (CStWP), Conservation Security Program (CSP), and general conservation technical assistance program. Additional CPs were installed through FSA's Conservation Reserve Program (CRP), the OCC's Locally Led Cost-Share Program (LLCP), and with funding from the U.S. Environmental Protection Agency's (EPA) CWA section 319 program.

From 2001 to 2010, landowners installed CPs to reduce erosion and runoff, including 112,304 feet of cross- and riparian-protection fencing, 14,400 acres of prescribed grazing, 107 acres of critical area planting, 111 ponds, 32 watering facilities, 2,182 feet of livestock pipeline, two wells, 597 acres of pasture and hayland planting, 50 grade-stabilization structures,

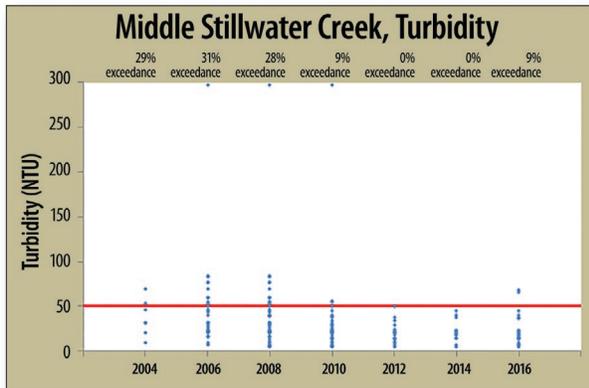


Figure 2. Monitoring data indicate that turbidity levels in Stillwater Creek have declined.

174 acres of range planting, two heavy use areas, one livestock winter feeding facility, 1,037 acres of forage harvest management, 881 acres of nutrient management, 5,669 acres of brush management, 3,112 acres of prescribed burning, one water control structure, 513 acres of access control, 9 acres of riparian forest buffer, 2,937 acres of integrated pest management (IPM), six diversions, 1,448 acres of upland wildlife habitat management, 47 acres of waste recycling, and 121,256 feet of firebreak. Twenty-two improperly designed or malfunctioning septic systems were replaced or improved. One leaky septic lagoon was replaced with an appropriately designed lagoon.

Landowners also implemented cropland CPs including 113 acres of conservation crop rotation, 395 acres of conservation cover, 131 acres of no-till residue and tillage management, 546 acres of reduced tillage or mulch-till residue and tillage management, 10 grassed waterways, 64 acres of filter strips, 11,033 feet of terrace, 1,406 feet of diversion, and 118 acres of seasonal residue management.

Partners continued to implement CPs in 2011–2016, including 197 acres of livestock access control, 2,209 acres of brush management, 244 acres of conservation cover, 60 acres of conservation crop rotation, 14 acres of continuous cover crops, 32 acres of critical area planting, 30,253 feet of cross-fencing, 209 acres of forage and biomass planting, 969 acres of forage harvest management, 15,102 feet of firebreak, 10 grade stabilization structures, 1 acre of grassed waterway, 4 acres of heavy use area protection, 150 acres of IPM,

408 acres of nutrient management, 25 ponds, 450 acres of prescribed burning, 13,645 acres of prescribed grazing, 30 acres of range planting, 1,255 acres of no-till residue and tillage management, 1,186 acres of reduced-till residue and tillage management, 286 acres of seasonal residue management, 55 acres of split nitrogen applications, 1,534 acres of supplement/feeding area rotation, 772 acres of upland wildlife management, and four watering facilities.

## Results

Through its statewide nonpoint source Rotating Basin Ambient Monitoring Program, the OCC documented improved water quality in Stillwater Creek due to erosion-control CPs implemented by landowners. Monitoring data compiled for the 2010 integrated report showed that turbidity in Stillwater Creek had decreased such that only 9 percent of baseflow samples exceeded 50 NTU; exceedances remained below 10 percent for the 2016 assessment (Figure 2). On the basis of these data, the middle segment of Stillwater Creek was removed from the Oklahoma CWA section 303(d) list for turbidity in 2010. Stillwater Creek now partially supports its warm water aquatic beneficial use. Monitoring will continue to ensure water quality improvement is maintained and to document improvement in its other two segments.

## Partners and Funding

The OCC monitoring program is supported in part by EPA CWA section 319 funds at an average annual statewide cost of \$1 million. Approximately \$500,000 in EPA 319 funds support statewide water quality educational efforts through Blue Thumb. From 2001 to 2006, EPA 319 funds supported \$146,337 worth of CPs, with an additional \$135,538 in state funding and with \$165,965 in matching funds from landowners. From 2004 to 2016, NRCS supplied at least \$412,000 to implement CPs through EQIP, CStwP and CSP. Additional dollars were provided through CRP. Additional funds were provided through FSA for CRP practices. In addition, a significant number of practices were funded by landowners based on recommendations through NRCS general technical assistance and conservation planning. The LLCP provided \$39,637 in funding for CP installation which was matched by \$73,945 from cooperating landowners.



U.S. Environmental Protection Agency  
Office of Water  
Washington, DC

EPA 841-F-16-001Q  
August 2016

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